

Observing Soil Moisture in Agricultural Environments

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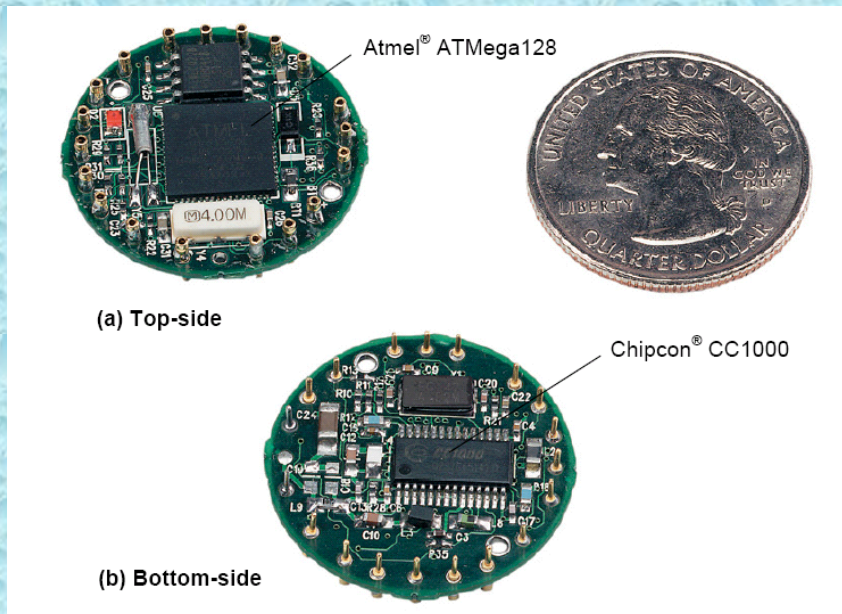
Observing Soil Moisture

- Ground reference strategy
- Meteorological observations
- Satellite and aerial observations

Ground Reference Strategy

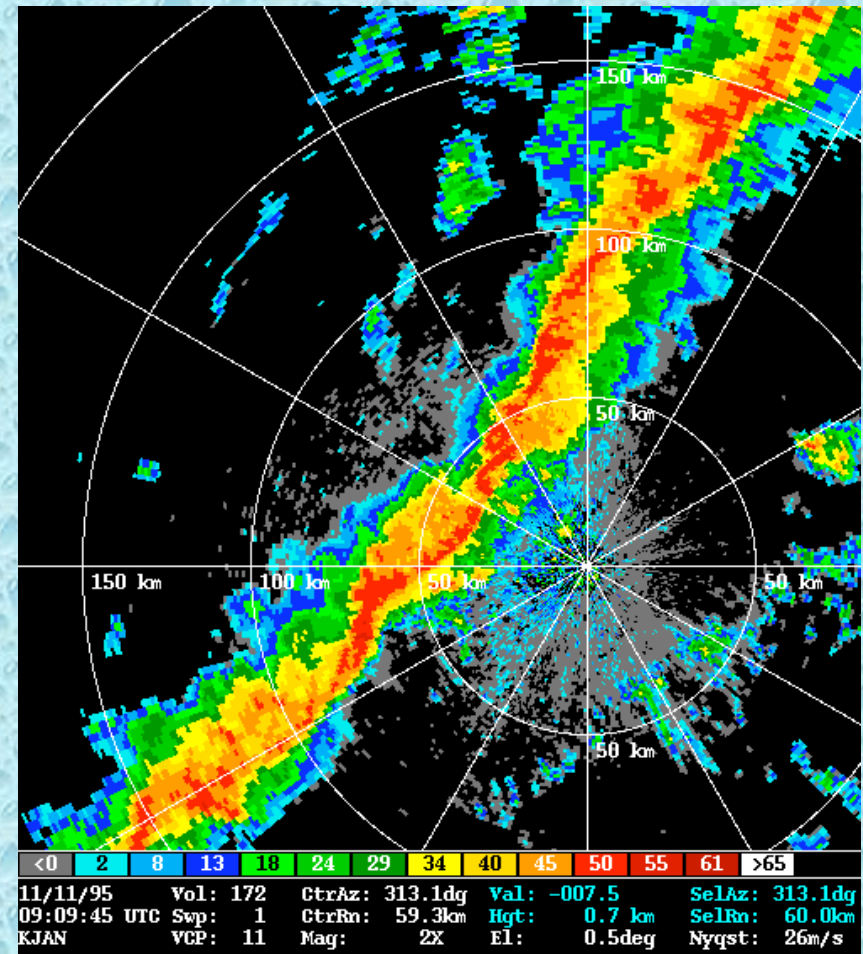
Laboratory Testing (current)

- Capacitance probes
- Wireless networking



Meteorological Observations

- **Purdue University is a Level II distributor of Doppler Radar**
- **Precipitation is closely related to soil moisture**



Remote Sensing of Soil Moisture

- USDA ARS: Hydrology and Remote Sensing Lab often uses L-band microwaves around 1-3 GHz
- Aerial collection of reflected GPS signal as discussed by J. Garrison and S. Katzberg

In Conclusion

- Our ground reference strategy may provide cost-effective value to agriculture
- We want to determine the potential scalability and resolution of our ground reference strategy
- Remotely sensed data allows for more detailed analysis, more complex models and coverage of larger spatial scales
- We seek to provide: decision support capability at the local level; assessment and modeling of soil moisture at the regional level

References

Academic Resources:

Dr. Keith Cherkauer, Primary Advisor

The staff and facility of LARS at Purdue University

Purdue University Graduate School and Department of Agricultural Engineering

Doppler radar image:

Professor Matthew Huber, Earth and Atmospheric Sciences, Purdue University

Network Communications Technology and images:

Crossbow Technology, Incorporated. San Jose, CA 95134 USA www.xbow.com

Soil Moisture Probes and image:

Decagon Devices, Incorporated. Pullman, WA 99163 USA www.decagon.com

Literature Review:

J. Garrison and S. Katzberg, 1999. *GPS Surface Reflection Technology Requirements for Space Applications*, Final Report to the Earth Science Technology Office

T. Schmugge, W. Kustas, J. Ritchie, T. Jackson, A. Rango, 2002. *Remote Sensing in Hydrology*, *Advances in Water Resources*, 2002; vol. 25 pp. 1367-1385

J. Frankenberger and B. Erickson, 2004. *Using Geospatial Information to Design and Install Drainage at the Davis-Purdue Agriculture Center*, Newsletter of the Site-Specific Management Center, Purdue University

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